

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371U.S. APPLICATION NO. (if known,
see 37 CFR 1.5)

JC05 Rec'd

16/070986
14 MAR 2002INTERNATIONAL APPLICATION NO.
PCT/SE00/01752INTERNATIONAL FILING DATE
September 11, 2000PRIORITY DATE CLAIMED
September 15, 1999TITLE OF INVENTION
APPLICANT(S) FOR DO/EO/USAN APPARATUS FOR SORTING TIMBER
Cenneth Gunnarsson.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau (see accompanying PCT Form 308).
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 34 (35 U.S.C. 371).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 34 (35 U.S.C. 371).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
 - ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 - a. PCT Publication WO 01/21331 with International Search Report (PCT/ISA/210)
 - b. PCT Notification of Receipt of Record Copy (Form PCT/IB/301)
 - c. Notification Concerning Submission or Transmittal of Priority Document (Form PCT/IB/304)
 - d. International Preliminary Examination Report (Form PCT/IPEA/409)
 - e. Verified Statement Claiming Small Entity Status

ATTORNEY'S DOCKET NUMBER
33980R002TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371U.S. APPLICATION NO. (if known, see
37 CFR 1.5)

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17. ☒ The following fees are submitted:

CALCULATIONS

PTO USE ONLY

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO \$890.00

International preliminary examination fee paid to USPTO
(37 CFR 1.482) \$710.00No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee
paid to USPTO (37 CFR 1.445(a)(2)) \$740.00Neither international preliminary examination fee (37 CFR 1.482) nor
international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 1,040.00International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(2)-(4) \$100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$1040.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed
priority date (37 CFR 1.495(e)).

\$ ---

Claims

Number Filed

Number Extra

Rate

Total Claims 10 - 20 = 0 x \$18.00

Independent Claims 1 - 3 = 0 x \$84.00

Multiple dependent claim(s) (if applicable) + \$280.00 .00

TOTAL OF ABOVE CALCULATIONS =

\$ 1040.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note
37 CFR 1.9, 1.27, 1.28).

520.00

SUBTOTAL =

\$520.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest
claimed priority date (37 CFR 1.492(f)).

+

TOTAL NATIONAL FEE =

520.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an
appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property.

+

40.00

TOTAL FEES ENCLOSED =

\$560.00



00441

PATENT TRADEMARK OFFICE

Amount to be
refunded \$

charged \$

a. ☒ A check in the amount of \$560.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. _____ in the amount of \$_____ to cover the above fees.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4300.NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and
granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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Washington, D.C. 20036

Telephone: (202) 659-2811

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SIGNATURE

Dennis C. Rodgers, Reg. No. 32,936

NAME

REGISTRATION NO.

Date: March 14, 2002

BDW Form SED-2
Small Entity
Small Business Concern

Applicant or Patentee: (inventors)

Serial or Patent No.: (if known) _____ Filed or Issued: (if known) _____

Att. Dkt. No.: _____

For: (invention title) An apparatus for sorting timber

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(d) AND 1.27(c)) - SMALL BUSINESS CONCERN

I hereby declare that I am: (check one)

☐ the owner of the small business concern identified below:☒ an official of the small business concern empowered to act on behalf of the concern identified below:NAME OF CONCERN C. Gunnarssons Verkstads AB
ADDRESS OF CONCERN Ölvägen, SE-340 30 Vislanda, Sweden

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the above-identified invention described in

(check one) ☐ the specification filed herewith☐ application serial no. _____, filed _____☐ patent no. _____, issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below and no rights to the invention are held by any person, other than the inventor, who could not qualify as an independent inventor under 37 CFR 1.9(c) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

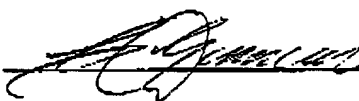
NAME _____
ADDRESS _____☐ INDIVIDUAL☐ SMALL BUSINESS CONCERN☐ NONPROFIT ORGANIZATIONNAME _____
ADDRESS _____☐ INDIVIDUAL☐ SMALL BUSINESS CONCERN☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Gunneth Gunnarsson
TITLE OF PERSON OTHER THAN OWNER _____
ADDRESS OF PERSON SIGNING Vaxjövägen, SE-340 30 Vislanda, Sweden

SIGNATURE



DATE

2002-07-12

33980R002

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Cenneth Gunnarsson

International Application No.: PCT/SE00/01752

International Filing Date: September 11, 2000

U.S. Serial No.: To Be Assigned

Group Art Unit: To Be Assigned

Filed: : Herewith

Examiner: To Be Assigned

For: AN APPARATUS FOR SORTING TIMBER

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to or concurrent with calculation of the filing fees, please amend this application as follows.

IN THE CLAIMS

Applicant has attached to this Amendment documents entitled "Amended Claims" and "Marked-Up Copy of Previous Claims". Please amend claims 3, 4, 5, 6, 8, 9 and 10 as shown in the document entitled "Marked-Up Copy of Claims".

REMARKS

Entry and consideration of this Preliminary Amendment is respectfully requested prior to or concurrent with calculation of the filing fees. This Preliminary Amendment is being filed to remove the multiple dependent claims to avoid the surcharge.

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Examination on the merits is awaited.

Respectfully submitted,

SMITH, GAMBRELL & RUSSELL, LLP

By: 

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March 14, 2002

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MARKED UP COPY OF CLAIMS

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3. (Amended) The apparatus as claimed in Claim 1 [or 2], characterised in that the transfer members (13) are elongate and substantially straight with slightly obliquely upwardly end section, and extend in their active positions in the longitudinal direction out from the infeed ends of the sorting compartments (1) and with the end sections slightly obliquely upwards towards the conveyor (2).

4. (Amended) The apparatus as claimed in [any of Claims 1 to 3] Claim 1, characterised in that said transfer members (13) have roller paths (14) at least on the upper side of the end sections.

5. (Amended) The apparatus as claimed in [any of Claims 1 to 3] Claim 1, characterised in that the end sections of the transfer members (13) have circulating driven belts on which the timber pieces rest and which impart to the timber pieces an additional movement in a direction towards a sorting compartment (1).

6. (Amended) The apparatus as claimed in [any of Claims 1 to 5] Claim 1, characterised in that said transfer members (13) are movable in a substantially translation movement to and from active position.

8. (Amended) The apparatus as claimed in [any of Claims 6 or 7] Claim 6, characterised in that the translation movement for the transfer members (13) is of adjustable length.

9. (Amended) The apparatus as claimed in [any of Claims 1 to 8] Claim 1, characterised in that the conveyor (2) has carriers (5) for supporting a timber piece with approximately horizontal longitudinal direction; and that the carriers incline obliquely downwards in a direction towards the infeed ends of the sorting compartments (1).

10. (Amended) The apparatus as claimed in [any of Claims 3 to 9] Claim 3, characterised in that said carriers (5) and the end sections of said transfer members (13) have approximately the same inclination.

AMENDED CLAIMS

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3. (Amended) The apparatus as claimed in Claim 1, characterised in that the transfer members (13) are elongate and substantially straight with slightly obliquely upwardly end section, and extend in their active positions in the longitudinal direction out from the infeed ends of the sorting compartments (1) and with the end sections slightly obliquely upwards towards the conveyor (2).

4. (Amended) The apparatus as claimed in Claim 1, characterised in that said transfer members (13) have roller paths (14) at least on the upper side of the end sections.

5. (Amended) The apparatus as claimed in Claim 1, characterised in that the end sections of the transfer members (13) have circulating driven belts on which the timber pieces rest and which impart to the timber pieces an additional movement in a direction towards a sorting compartment (1).

6. (Amended) The apparatus as claimed in Claim 1, characterised in that said transfer members (13) are movable in a substantially translation movement to and from active position.

8. (Amended) The apparatus as claimed in Claim 6, characterised in that the translation movement for the transfer members (13) is of adjustable length.

9. (Amended) The apparatus as claimed in Claim 1, characterised in that the conveyor (2) has carriers (5) for supporting a timber piece with approximately horizontal longitudinal direction; and that the carriers incline obliquely downwards in a direction towards the infeed ends of the sorting compartments (1).

10. (Amended) The apparatus as claimed in Claim 3, characterised in that said carriers (5) and the end sections of said transfer members (13) have approximately the same inclination.

AN APPARATUS FOR SORTING TIMBER

TECHNICAL FIELD

5 The present invention relates to an apparatus for sorting individual timber pieces of different dimensions and/or qualities into a number of mutually superposed sorting compartments, and comprising a conveyor for vertical transport along the infeed ends of the sorting compartments of individual timber pieces with their longitudinal direction approximately horizontal and transversely directed in relation to the longitudinal direction of the sorting compartments, and a transfer device for
10 transferring a specific timber piece from the conveyor to a specific sorting compartment.

BACKGROUND ART

15 Apparatuses of the type intimated by way of introduction are previously known in the art. The individual sorting compartments are represented by approximately horizontal conveyors of considerable length, of the order of magnitude of 50-100 m or possibly more. These conveyors are superposed on one another with a spacing of
20 approximately 30-40 cm. The number of sorting compartments in the vertical direction may be large, often as many as 30-50 in number.

Along the infeed ends of the sorting compartments, a conveyor runs which transports the individual timber pieces up to a certain, predetermined sorting compartment
25 where the timber piece is discharged by means of a transfer device and is fed into the selected sorting compartments. The individual timber pieces may arrive in random sequence as regards dimensions and qualities, but are identified and registered by a computer which controls the transfer devices so that the timber pieces are fed to the correct sorting compartment. The conveyor which runs in conjunction with the
30 infeed ends of the sorting compartments moves continuously.

The transfer devices have hitherto been placed in the downwardly moving conveyor which is in conjunction with the infeed ends of the sorting compartments. This implies that, when a transfer device is activated, it must extend through the path

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which the individual timber pieces described on the downwardly moving conveyor. This entails that a transfer device must be activated, transfer its timber piece to the associated sorting compartment and thereafter return to the starting position outside the path of movement of the timber pieces before a new timber piece may pass. Such
5 a work cycle takes considerable time, and so capacity will not be that intended.

It has thus been the work rate of the transfer devices which has hitherto limited the overall capacity of the plant. As a result, it has not been possible to carry out such working operations as sawing, normal mechanised transport within the plant, cutting-
10 to-length, etc., at maximum speed, for which reason the plant as a whole has too low capacity.

In order to attempt to increase the capacity of the plant, the time available for each working cycle in the transfer devices has been increased. This has been achieved by
15 an increase of the linear transport length for each timber piece on the downwardly moving conveyor from the uppermost sorting compartment to the lowermost. In order to achieve this, the downwardly moving conveyor has been inclined in that the individual sorting compartments do not begin in a vertical plane but in a plane which inclines to the vertical. This has been realised in that an upper sorting compartment
20 extends out beyond a subjacent sorting compartment. Given that the downwardly moving conveyor follows this pattern and, hence, in principle maintains constant distance to the mouths of the sorting compartments, the linear transport length in the downwardly moving conveyor will be longer than would have been the case if the sorting compartments had been arranged with their infeed ends in a vertical plane.

25 The above-described oblique inclination of the infeed ends of the sorting compartments entails that the lowermost, and hence the shortest, sorting compartment will be dimensioned for the entire plant, for which reason extra costs are incurred for the unnecessarily long upper sorting compartments.

30 Furthermore, despite the oblique inclination of the conveyor, it has not been possible to achieve the work rate for the plant which is desirable.

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PROBLEM STRUCTURE

The present invention has for its object to design the apparatus intimated by way of introduction such that the drawbacks inherent in prior art technologies are obviated.

- 5 In particular, the present invention has for its object to design the apparatus according to the present invention so that its capacity is greatly improved as compared with prior art technology. Further, the present invention has for its object to obviate the need for unnecessarily long sorting compartments.

10 SOLUTION

- The objects forming the basis of the present invention will be attained if the apparatus intimated by way of introduction is characterised in that the transfer device has at least one transfer member per sorting compartment, and that each transfer
15 member is movable between a passive position outside the path of the conveyor and in conjunction with the infeed end of the sorting compartment, and an active position within the path of the conveyor for engagement with a timber piece carried by the conveyor and transferring it to the sorting compartment.

20 BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will now be described in greater detail hereinbelow, with particular reference to the accompanying Drawings. In the accompanying Drawings:

- 25 Fig. 1 is a vertical side elevation of the infeed ends of an arrangement of mutually superposed sorting compartments; and

Fig. 2 is a vertical side elevation, on a larger scale, of the apparatus according to the present invention.

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DESCRIPTION OF PREFERRED EMBODIMENT

Fig. 1 is a vertical side elevation of one end of a plant for sorting timber, so that the timber, after sorting, will be arranged according to timber dimension and quality,

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with each dimension and quality separately or possibly a range of dimensions or qualities together in each sorting compartment. The plant is based on a bearing structure of steel beams and, in the illustrated embodiment, is of a height of approximately 20m. The plant includes a number of sorting compartments 1 for accommodating selected timber pieces. The sorting compartments 1 are superposed on one another with a spacing in the vertical direction of 30-40 cm. Each sorting compartment includes a number of conveyors disposed at the same height and parallel with one another and supporting the timber pieces which lie only in one layer in each sorting compartment and which have their longitudinal direction horizontal and at right angles to the longitudinal directions of the conveyors and the sorting compartments, i.e. at right angles to the plane of the Drawings in Figs. 1 and 2.

At the left-hand end of the sorting compartments in Fig. 1, there is disposed a vertically running conveyor 2 with an upwardly moving part 3 and a downwardly moving part 4. The conveyor 2, which may suitably be vertical, has a number of uniformly spaced carriers 5 of which only an upper and a lower are intimated on the downwardly moving part 4. The carriers 5 are intended for carrying individual timber pieces such that these have their longitudinal direction horizontal and at right angles to the plane of the Drawings in Fig. 1. While only one conveyor 2 is shown in Fig. 1, it is assumed that at least two, but preferably three or four conveyors are disposed parallel with one another and with the carriers 5 at the same height so that a timber piece is, in practice, carried by a number of carriers 5.

For feeding timber pieces to the vertical conveyor 2, an incoming conveyor 6 is disposed uppermost in the beam frame and transports individual timber pieces in a direction from right to left in Fig. 1. In what sequence and what dimensions or qualities, respectively, the individual timber pieces have on the incoming conveyor 6 have previously been sensed and corresponding information stored in a computer. The individual timber pieces have thereby been allocated their own address, i.e. a sorting compartment 1 of their own.

Between the incoming conveyor 6 and the vertical conveyor 2, there is disposed a tilter 7 where each individual timber piece is displaced from the incoming conveyor 6 to one of the carriers 5 included in the vertical conveyor 2. During this transfer of

the individual timber pieces, they are turned over so that the original underside will be turned to face upwards when the timber pieces lie on the carriers 5.

The transfer of the individual timber pieces from the incoming conveyor 6 to the individual carriers 5 of the vertical conveyor 2 takes place in such a manner that the position of each individual timber piece is known on the downwardly moving part 4 of the vertical conveyor 2.

Fig. 2 shows a partial magnification of a part of Fig. 1, and this part may be located anywhere whatever in the vertical direction of the downwardly moving part 4 of the vertical conveyor.

It will be apparent from the Figure that the downwardly moving part 4 includes a profile rail 8 in which runs a chain which supports the individual carriers 5. The carriers are further guided interiorly in the profile rail with the aid of rollers 9. It will be apparent from the Figure that the carriers 5 incline downwards in a direction away from the profile rail 8 and in a direction towards the sorting compartments 1. Further, each carrier 5 has an upstanding arrest member 10 at its free end.

It will be apparent from Fig. 1 that the infeed ends of the sorting compartments 1 lie straight above one another in a common and substantially vertical plane. It will also be apparent that, between this plane and the carriers 5 of the downwardly moving part 4, there is a gap or interspace 11 which is substantially of uniform width throughout its vertical extent and which, for reasons of capacity, must be as narrow as is practically possible. Further, the free ends 10 of the carriers 5 move in a substantially vertical plane which is parallel with, or at least substantially parallel with, the plane defined by the infeed ends of the sorting compartments 1.

At the infeed end of each sorting compartment 1, there is disposed a transfer device 12 which has a transfer member 13 which is disposed for transferring an individual timber piece on a carrier 5 to the infeed end of a specific sorting compartment. The transfer device 12 is placed on that side of the interspace 11 which is turned to face towards the sorting compartments 1. Each transfer member 13 in the transfer devices 12 is movable between a passive position with an outer end portion outside the path

which is defined by the timber pieces on the downwardly moving part 4 of the conveyor 2 and in conjunction with the infeed end of the sorting compartment 1, and an active position with the end portion within the above-mentioned path for engagement with a timber piece carried by the conveyor 2 and transferring it to the
5 sorting compartment 1.

In Fig. 2, both of the transfer members 13 disposed uppermost in the Figure, i.e. those transfer members disposed in conjunction with sorting compartments 1a and 1b, are in their passive positions, while the transfer members which are disposed in
10 conjunction with sorting compartments 1c and 1d are located in their projecting, active positions. It will further be apparent that the outer end of the transfer members 13 at the sorting compartments 1a and 1b are located a slight distance from the carriers 5 and the timber pieces resting on them. This distance should be as slight as possible, since the necessary length of movement between the passive and active
15 positions of the transfer members 13 will then be shorter, as also applies to the time for a work cycle of the transfer member.

The transfer member 13 in conjunction with the sorting compartment 1c is located in its projecting, active position, and it will be apparent that the timber piece on the
20 carrier located immediately above the transfer member will be lifted free from the arrest member 10 when the carrier continues its downward movement. In such instance, the timber piece will rest on the transfer member 13 which inclines to the horizontal plane in approximately the same manner as the carriers 5 incline downwards. Given that the downwardly directed movement and speed of the timber
25 piece on the carrier 5 will be deflected into a movement and speed along the transfer member 13, the relevant timber piece will slide along the upper side of the transfer member or roll on the rollers 14 which are provided there. The timber piece on the lowermost transfer member shown in the Figure at sorting compartment 1d has partly been displaced along the transfer member in a direction to the right in on the sorting
30 compartment 1d where it is transported further in a direction to the right.

Each transfer member 13 is movable substantially in a translation movement which is generated by a cylinder unit 15 with a piston rod or ram 16. The free end of the piston rod 16 is pivotally secured at 21 in a rocker 17 which is pivotal about a shaft

18. The transfer member 13 proper is also pivotally secured in the rocker 17 at a pivot shaft 20. The outer and obliquely upwardly directed end portion of the transfer member is guided by and supported on a roller 19. Thus, the end portion may be lifted up from the roller 19.

5

When the apparatus according to the present invention is to work with varying widths of timber pieces, it is appropriate to design the drive means for the transfer members 13 in such a manner that the length of the translation movement is adjustable. In narrow timber pieces, a shorter movement may be selected, which increases the work rate of the transfer device. On the other hand, in wide timber pieces a longer length of movement is selected in order to ensure that the wide timber piece may reliably be able to rest on the end section of the transfer member 13 when it is lifted free of the carrier 5 on which it has rested.

10

15 The above-described geometry entails that the transfer member 13, in particular its outer end section, superposed on the translation movement, also has vertical movement components. Because of the angling of the transfer member 13 upwards in a direction in towards the vertical conveyor and its support on the roller 19, it will have, from the active position (at compartments 1c and 1d), a considerable downward movement, for which reason the risk is greatly reduced that a timber piece which is in the process of being transferred from a carrier 5 to the transfer member 13 will bounce – both are moving downwards. This downwardly directed movement also entails that the risk is reduced that the next carrier 5 and timber piece resting thereon will collide with an end section of a transfer member 13 which is on its way in towards a sorting compartment 1.

20

25

Further, the angle of the transfer member 13 in relation to a horizontal plane is greater in the active position (corresponds more closely to the inclination of the carrier 5) than is the case in the passive position.

30

The speed of the transfer member 13 is not uniform, thus the illustrated geometry gives a relatively slow acceleration/retardation in the proximity of the passive position, for which reason a timber piece is gently braked to a speed which is suitable for infeed into a sorting compartment. In the active, projecting position, the

acceleration/retardation is considerably greater, for which reason the transfer member 13 on return to its passive position will rapidly achieve a speed which corresponds to or exceeds the speed of movement of the timber piece.

- 5 As an alternative to the roller path with the rollers 14 on the outer section of the transfer members, it is also possible to employ a driven belt which circulates with its upper part in a direction in towards the sorting compartment 1. In such a construction, each timber piece is driven by machine power in towards the sorting compartment 1 and is not exclusively reliant on force of gravity and the movement
10 which has been imparted to a timber piece by a carrier 5.

- The retraction of the transfer member 13 and a timber piece resting thereon may be initiated as soon as the timber piece rests so securely on the transfer member 13 that there is no need to fear that it will fall down over the free end of the transfer member
15 13. In order to reduce this risk and in order to increase the acceleration in a direction to the right in Fig. 2 which the transfer member 13 may undergo in its return movement back to the passive position, the rollers 14 may be provided with a friction-increasing coating and one-way locks to prevent rotation in the wrong direction.

- 20 In terms of performance, the present invention realises a considerable improvement over the prior art technology disclosed by way of introduction. This is partly based on the foregoing, but is also because of the fact that the counterpart to the transfer member of the present invention in prior art technology must execute a complete
25 return movement from its discharge position in the sorting compartment and through the path which the timber pieces follow along the downwardly moving conveyor before it is back at its starting position and a new timber piece may pass.

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WHAT IS CLAIMED IS:

1. An apparatus for sorting individual timber pieces of different dimensions and/or qualities into a number of mutually superposed sorting compartments (1),
5 comprising a conveyor (2) for vertical transport along the infeed ends of the sorting compartments of individual timber pieces with their longitudinal direction approximately horizontal and transversely directed in relation to the longitudinal direction of the sorting compartments, and a transfer device (12) for transferring a specific timber piece from the conveyor (2) to a specific sorting compartment,
10 characterised in that the transfer device (12) has at least one transfer member (13) per sorting compartment (1); and that each transfer member is movable between a passive position outside the path (4) of the conveyor and in conjunction with the infeed end of the sorting compartment, and an active position within the path of the conveyor for engagement with a timber piece carried by the conveyor and
15 transferring it to the sorting compartment (1).

2. The apparatus as claimed in Claim 1, characterised in that the conveyor (2) has a substantially vertical and rectilinear path of movement (4) from above and downwards, which is located a slight distance (11) from the infeed ends of the
20 sorting compartments, which lie substantially in a common vertical plane.

3. The apparatus as claimed in Claim 1 or 2, characterised in that the transfer members (13) are elongate and substantially straight with slightly obliquely upwardly end section, and extend in their active positions in the longitudinal
25 direction out from the infeed ends of the sorting compartments (1) and with the end sections slightly obliquely upwards towards the conveyor (2).

4. The apparatus as claimed in any of Claims 1 to 3, characterised in that said transfer members (13) have roller paths (14) at least on the upper side of the end
30 sections.

5. The apparatus as claimed in any of Claims 1 to 3, characterised in that the end sections of the transfer members (13) have circulating driven belts on which the

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timber pieces rest and which impart to the timber pieces an additional movement in a direction towards a sorting compartment (1).

6. The apparatus as claimed in any of Claims 1 to 5, **characterised in that** said transfer members (13) are movable in a substantially translation movement to and from active position.

7. The apparatus as claimed in Claim 6, **characterised in that** onto the translation movement of the transfer member (13) in the region of its active position on return towards the passive position, there is superposed a downwardly directed movement component at the end section of the transfer member.

8. The apparatus as claimed in any of Claims 6 or 7, **characterised in that** the translation movement for the transfer members (13) is of adjustable length.

9. The apparatus as claimed in any of Claims 1 to 8, **characterised in that** the conveyor (2) has carriers (5) for supporting a timber piece with approximately horizontal longitudinal direction; and that the carriers incline obliquely downwards in a direction towards the infeed ends of the sorting compartments (1).

10. The apparatus as claimed in any of Claims 3 to 9, **characterised in that** said carriers (5) and the end sections of said transfer members (13) have approximately the same inclination.

(19) World Intellectual Property Organization
International Bureau



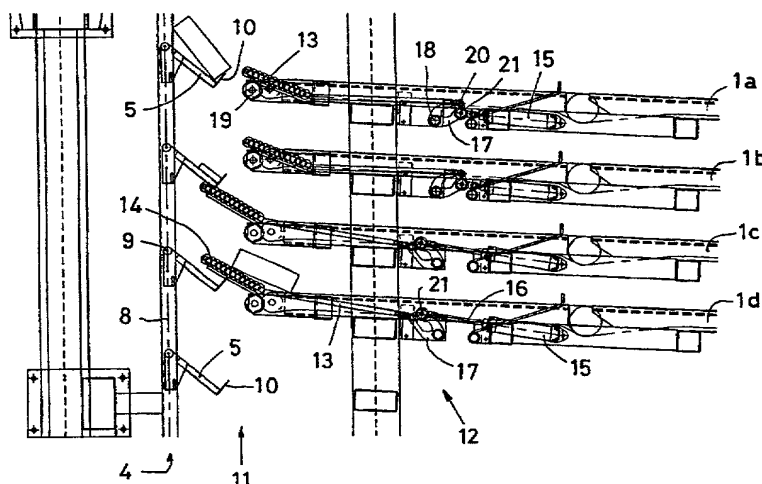
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(54) Title: AN APPARATUS FOR SORTING TIMBER

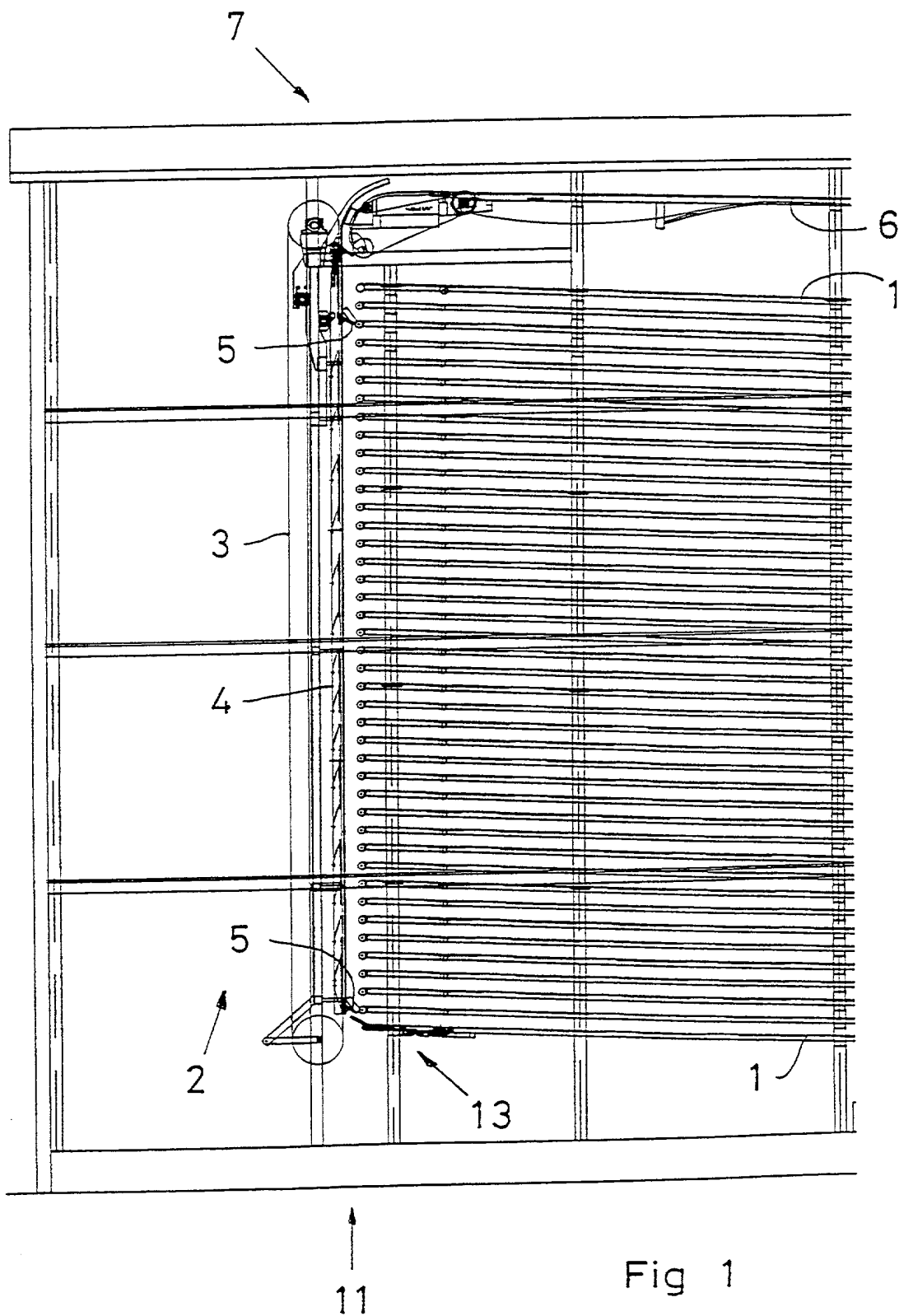


(57) Abstract: An apparatus for sorting individual timber pieces of different dimensions and/or qualities into a number of mutually superposed sorting compartments (1) comprises a conveyor and a transfer device (12). The conveyor transports individual timber pieces in the vertical direction along the infeed ends of the sorting compartments (1). The longitudinal direction of the timber pieces is approximately horizontal and transversely directed in relation to the longitudinal direction of the sorting compartments (1). The transfer device (12) transfers a specific timber piece from the conveyor to a specific sorting compartment (1). The transfer device (12) has at least one transfer member (13) per sorting compartment (1). Each transfer member (13) is movable between a passive position outside the path (4) of the conveyor and an active position within the path (4) of the conveyor. The path (4) of the conveyor is substantially vertical and rectilinear and located a distance (11) from the infeed ends of the sorting compartments (1).

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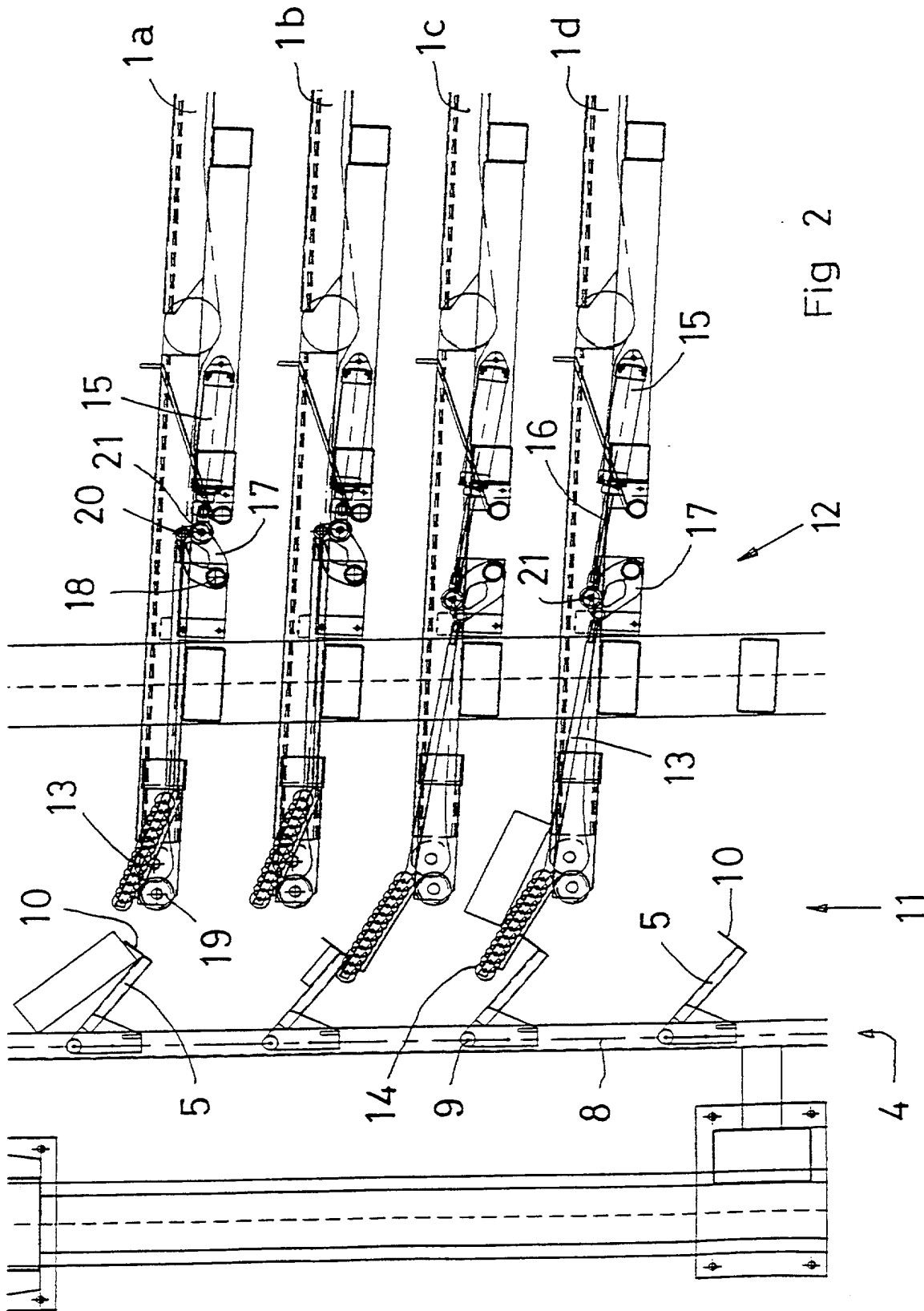


Fig 2

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Declaration and Power of Attorney United States Patent Application

Patents and Design Patents
Sole & Joint Inventors
Convention & Non-convention
PCT & Non-PCT
This form cannot be amended, altered
or changed after it is signed.
(For use only for inventors who
understand the English language.)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint

inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the
invention entitled An apparatus for sorting timber

(check one) ☐ is attached hereto.
☐ was filed as U.S. Application No. _____ on _____ and (if applicable)
was amended on _____
☒ was filed as PCT International Application No. SE00/001752 on 11 September 2000 and (if
applicable) was amended under PCT Article 19 on _____.
(I authorize any attorney appointed below to insert information in the preceding blanks.)

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.
I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign and PCT application(s) for patent or inventor's
certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America listed in this Declaration.
I have also identified below any foreign application for patent or inventor's certificate or PCT international application having a filing date before that of the
application(s) on which priority is claimed:

Foreign/PCT Application No.	Country	Filing Date	Priority Claimed? (yes/no)
9903275-7	Sweden	15 September 1999	Yes

I hereby claim the benefit under Title 35, United States Code, §120 or §365(c) of any United States application and PCT international application designating the
United States of America listed in this Declaration and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States
application or PCT international application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose
information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior
application and the national or PCT international filing date of this application:

U.S. Application No.	Filing Date	Status (patented/pending/abandoned?)

I hereby claim priority benefits under Title 35 United States Code §119(e) of any U.S. provisional application(s) listed below:

U.S. Provisional Application No.	Filing Date

I hereby appoint the following attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to
be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or
both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of
the application or any patent issued thereon.

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Signature: [Signature] Date: 2002-03-12

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Residence (city, state, country): _____
Post office address: _____

Signature: _____ Date: _____

☐ Additional inventors and/or prior applications are listed in attached Supplemental Sheet(s).

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